Cenozoic Geology of the Colorado Plateau

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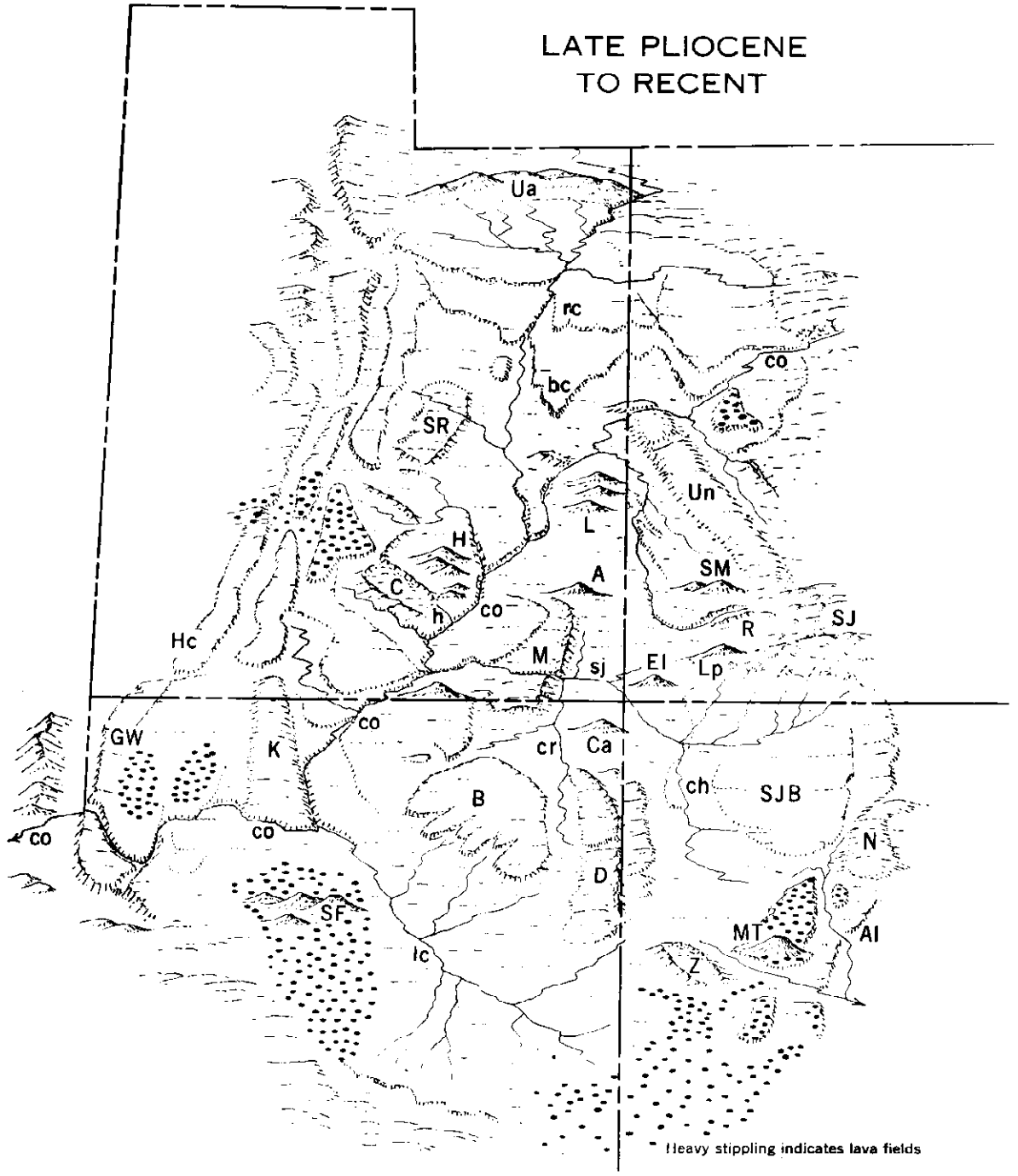
GEOLOGICAL SURVEY PROFESSIONAL PAPER 279

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1956



EXPLANATION

A	Abajo Mountains	GW	Grand Wash Cliffs	R	Rico Dome
Al	Alamosa fault	H	Henry Mountains	rc	Roan Cliffs
bc	Book Cliffs	h	Halls Creek	SF	San Francisco Mountain
BM	Black Mesa	Hc	Hurricane Cliffs	SJ	San Juan Mountains
C	Circle Cliffs upwarp	K	Kaibab upwarp	sj	San Juan River
Ca	Carrizo Mountains	L	La Sal Mountains	SJB	San Juan Basin
ch	Chaco River	lc	Little Colorado River	SM	San Miguel Mountains
co	Colorado River	Lp	La Plata Mountains	SR	San Rafael Swell
cr	Chinle Creek	M	Monument upwarp	Ua	Unita Mountains
D	Defiance upwarp	MT	Mount Taylor	Un	Uncompahgre upwarp
El	El Late Mountain	N	Nacimiento Mountains	Z	Zuni upwarp

FIGURE 62.—The Colorado Plateau in late Pliocene to Recent time. The canyons become reoccupied and cut deeper when the ponded water reaches the level of the uplifted stream beds.

FIGURE 61.—The Colorado Plateau in late Miocene to middle Pliocene time. Displacement continued on the boundary faults, such as the Hurricane, Grand Wash, and Alamosa faults. The Plateau rose epeirogenically and became tilted northeastward, causing the drainage to become ponded and to deposit formations such as the Browns Park and Bidahochi formations (stippled area). Formations such the Muddy Creek and Santa Fe formations were deposited in the basins around the edges of the Plateau. At this time, there occurred extensive eruptions of basalt and alkalic basalt.

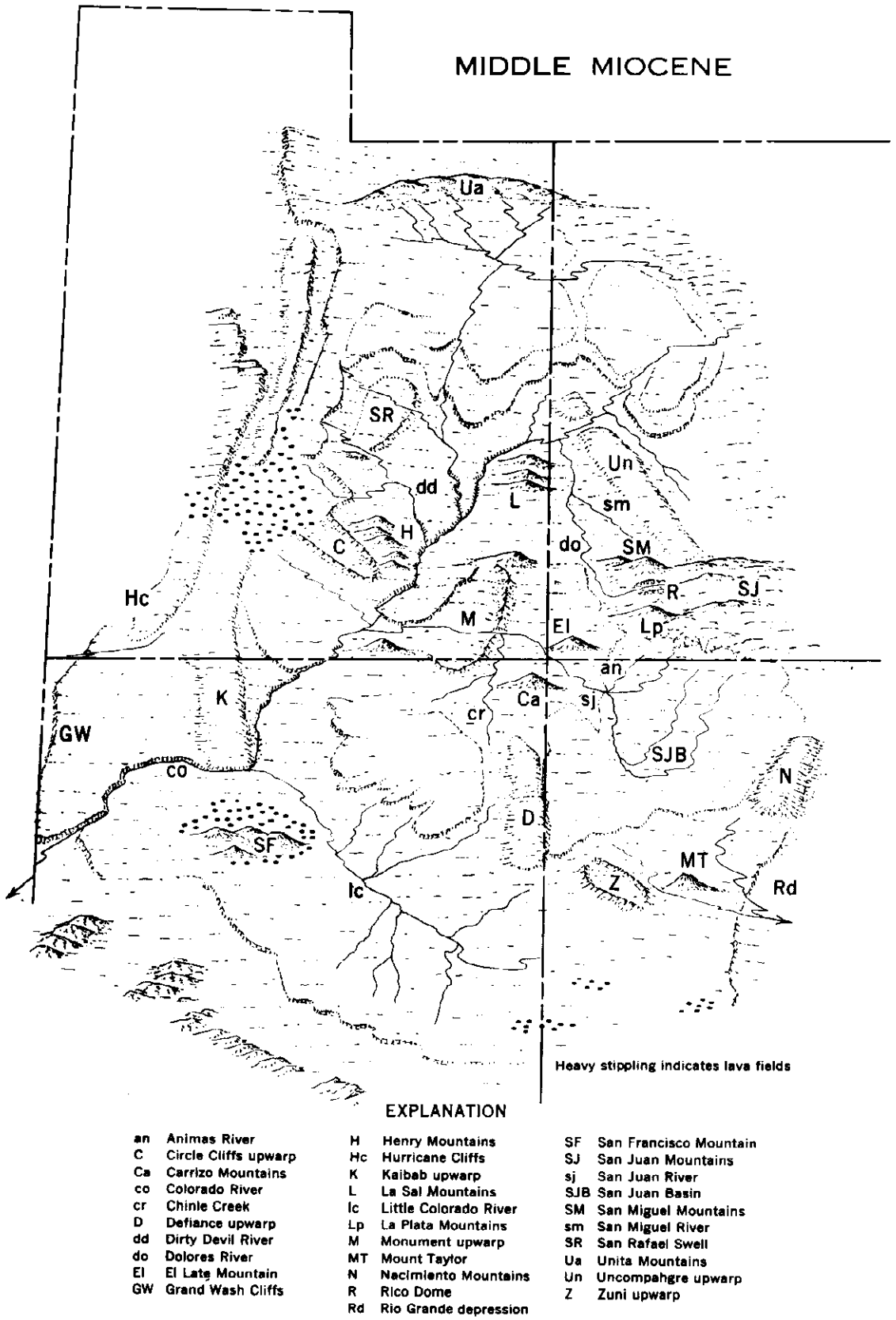


FIGURE 60.—The Colorado Plateau in middle Miocene time. The laccolithic mountains were formed, and there were eruptions at Mount Taylor, San Francisco Mountain, and at the volcanic pile in the central High Plateaus. The main streams were already superimposed on the uplifts, but these streams shifted monoclinically in adjustment to the intrusions. The valley of the Little Colorado River was in about the same position and about as deep as it is today. A considerable canyon already had formed in Grand Canyon.

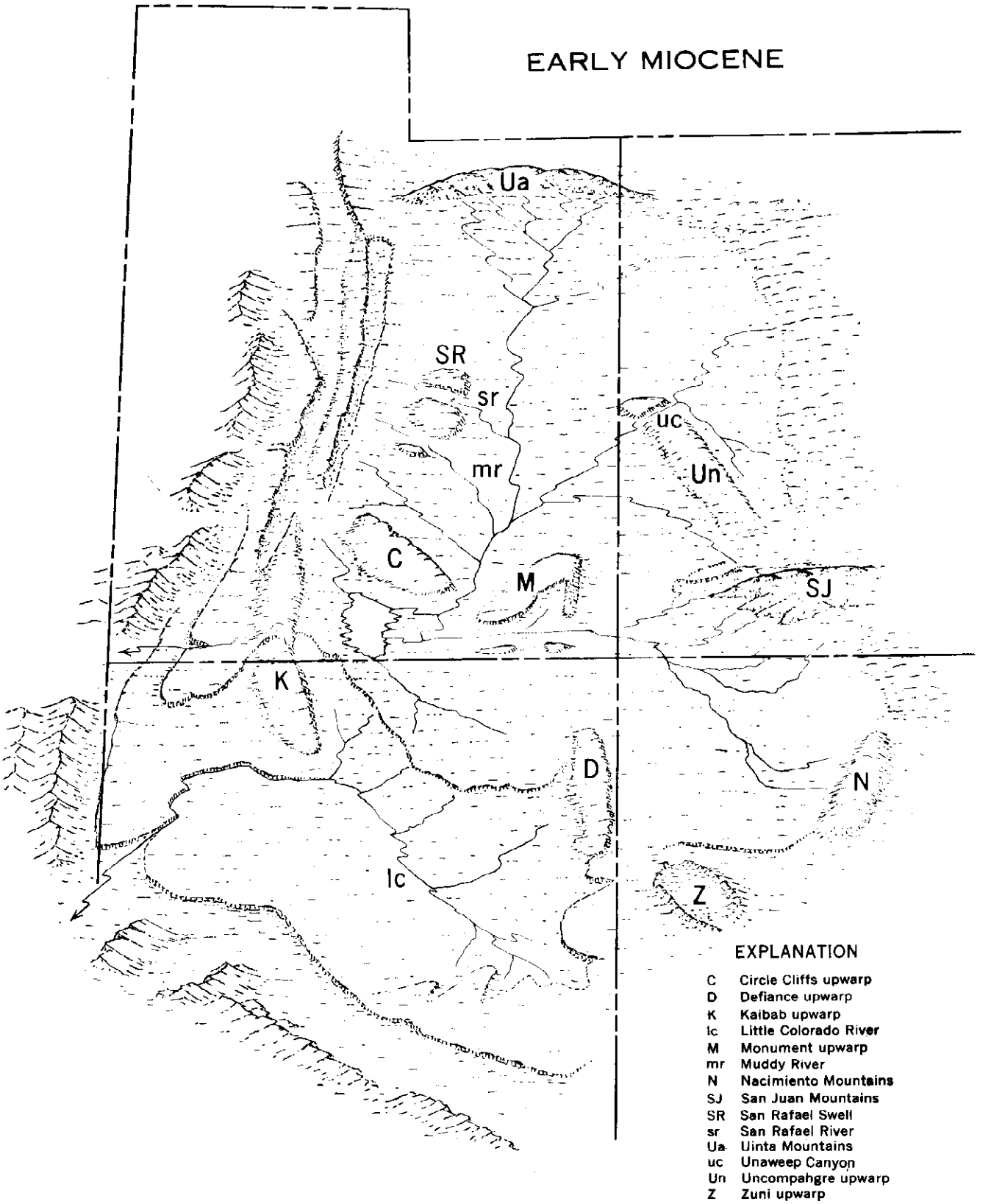


FIGURE 59.—The Colorado Plateau in early Miocene time. By early Miocene time, block faulting in the Basin and Range province had started; the basins are assumed to have been lower than the Colorado Plateau, but the ranges probably continued to be higher. Considerable movement had taken place along the boundary faults, and epeirogenic uplift presumably was started. The Little Colorado River was in existence (see fig. 60) and presumably drained westward approximately along the present course of the Colorado River. The High Plateaus were becoming outlined.

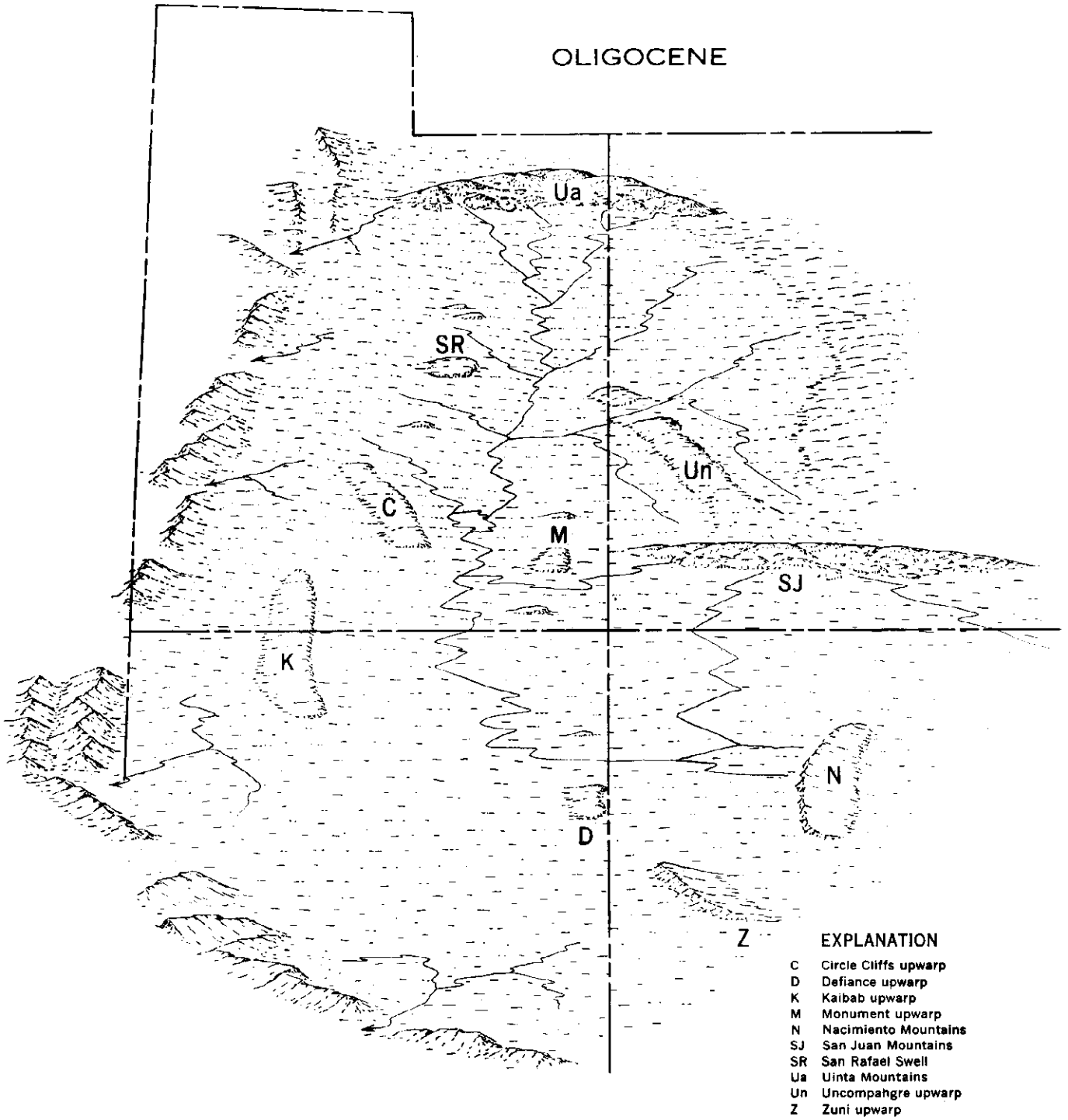


FIGURE 58.—The Colorado Plateau in Oligocene time. The beginning of block faulting in the Basin and Range province may have developed some basins that were lower than the area of the Plateau, and drainage around the edge of the Plateau may have been diverted into the basins. Presumably, this occurred although the Plateau area was still in part a trough and was still receiving sediments from the surrounding mountains.

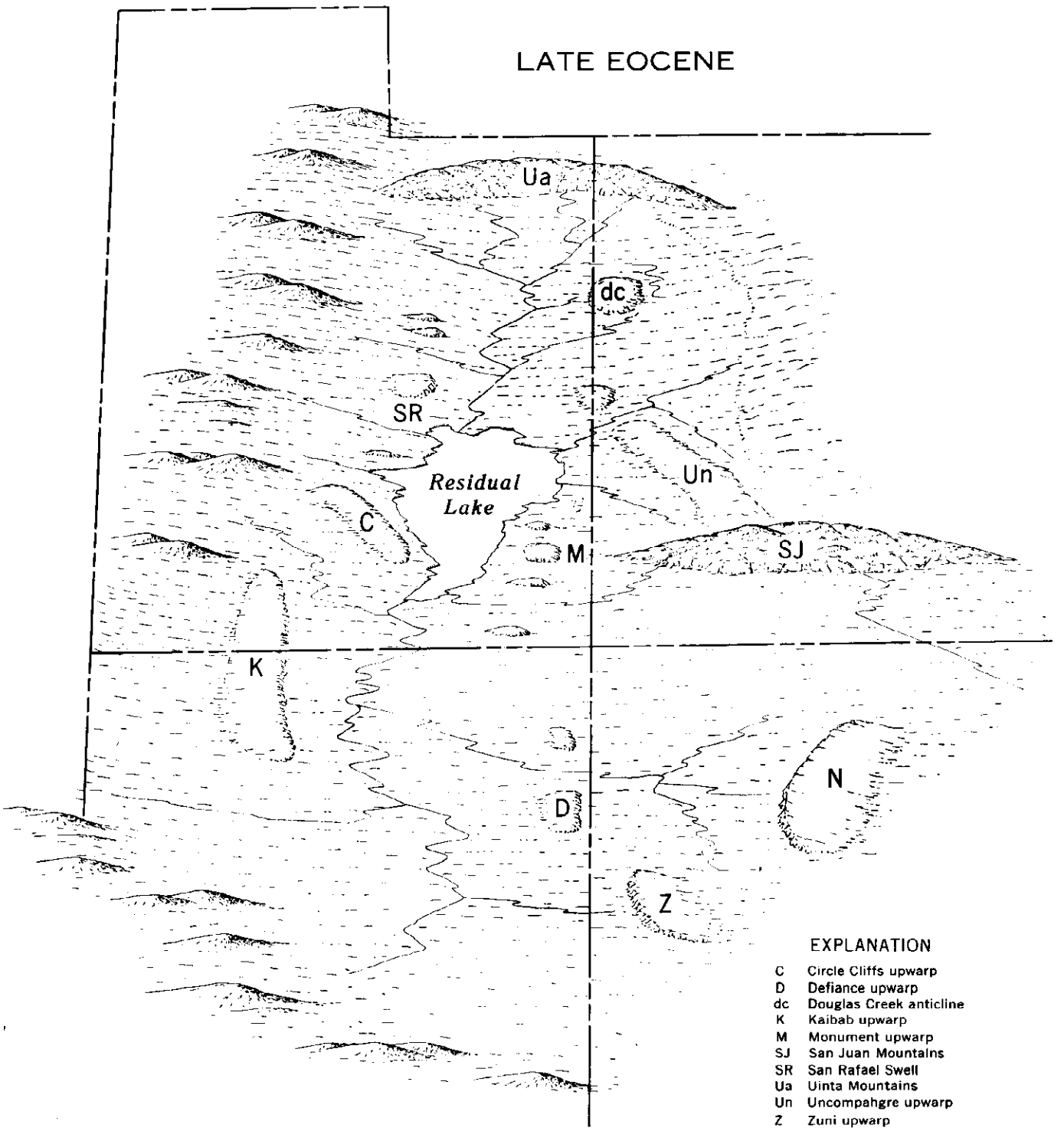


FIGURE 57.—The Colorado Plateau area in late Eocene time. Deposition of 5,000 feet of sediments in Green River lake, and deposition of a few thousand feet of fluviatile sediments, probably raised the surface of the Uinta Basin higher than some of the basins farther south on the Plateau. The Henry Mountains Basin between the Circle Cliffs and Kaibab uplifts, or the Escalante basin, may have been the lowest parts of the area. The Nacimiento Mountains were raised in middle or late Eocene time.

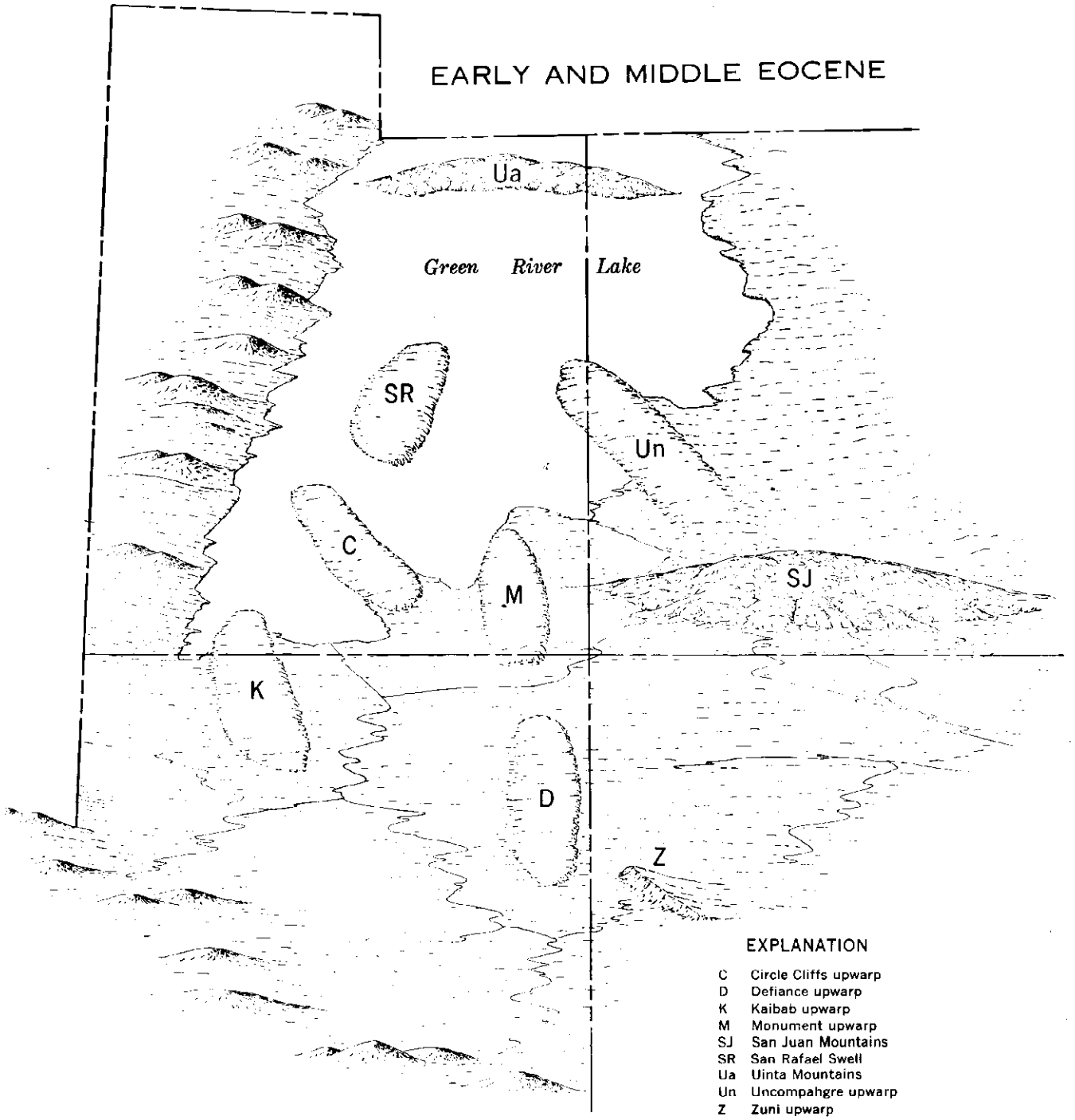


FIGURE 56.—The Colorado Plateau area in early and middle Eocene time. Downwarping of the Uinta Basin produced the Green River lake, which covered most of the north part of the Plateau area. Most of the uplifts, like the San Rafael Swell, probably stood higher than the lake and shed sediments into it.

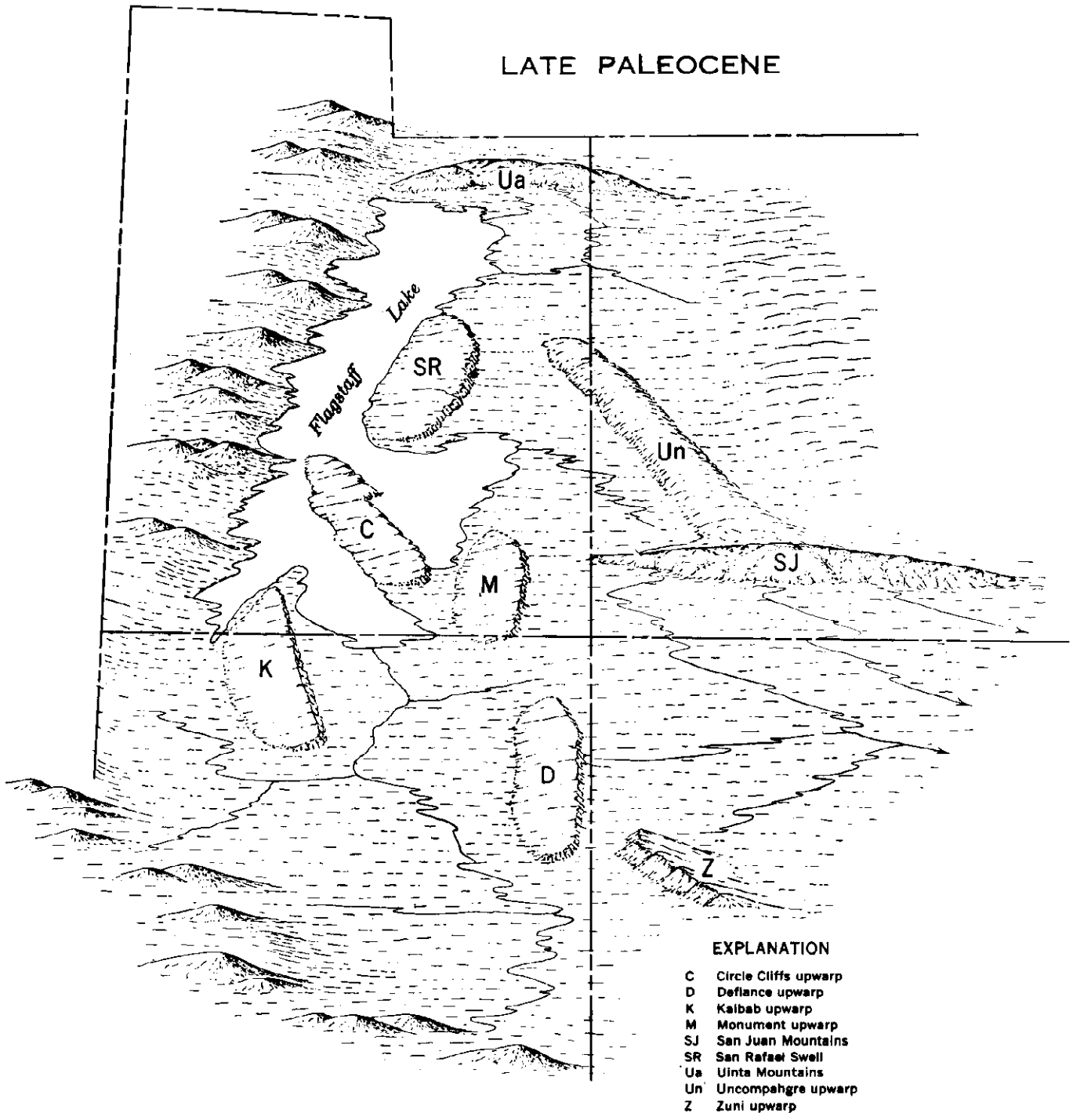


FIGURE 55.—The Colorado Plateau area in late Paleocene time. The Flagstaff lake was formed along the western edge of the Plateau area.

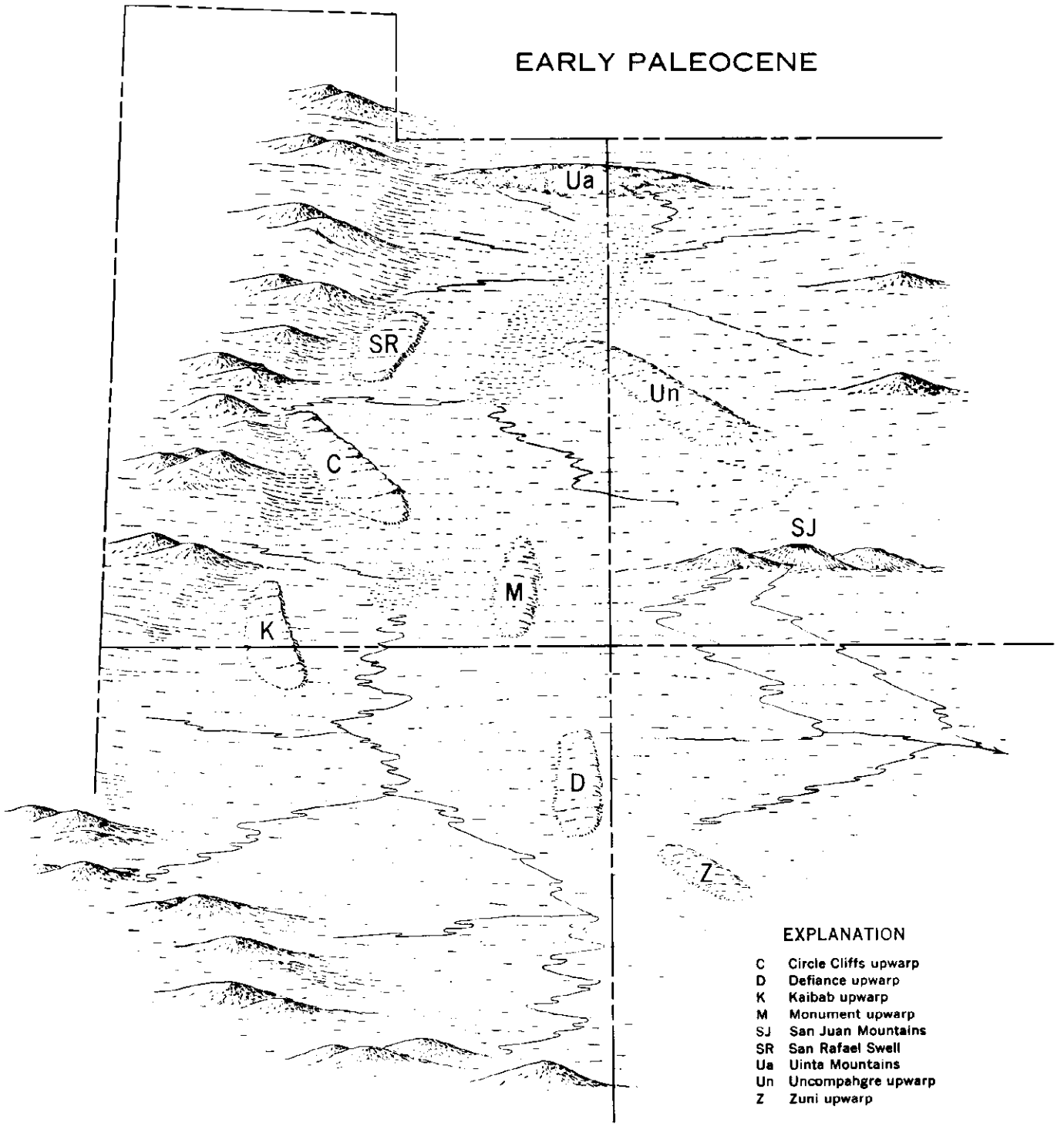


FIGURE 54.—The Colorado Plateau area in early Paleocene time. The principal folds on the Plateau had begun to form. There were volcanic mountains and (perhaps) uplifts in the area of the Rocky Mountains.

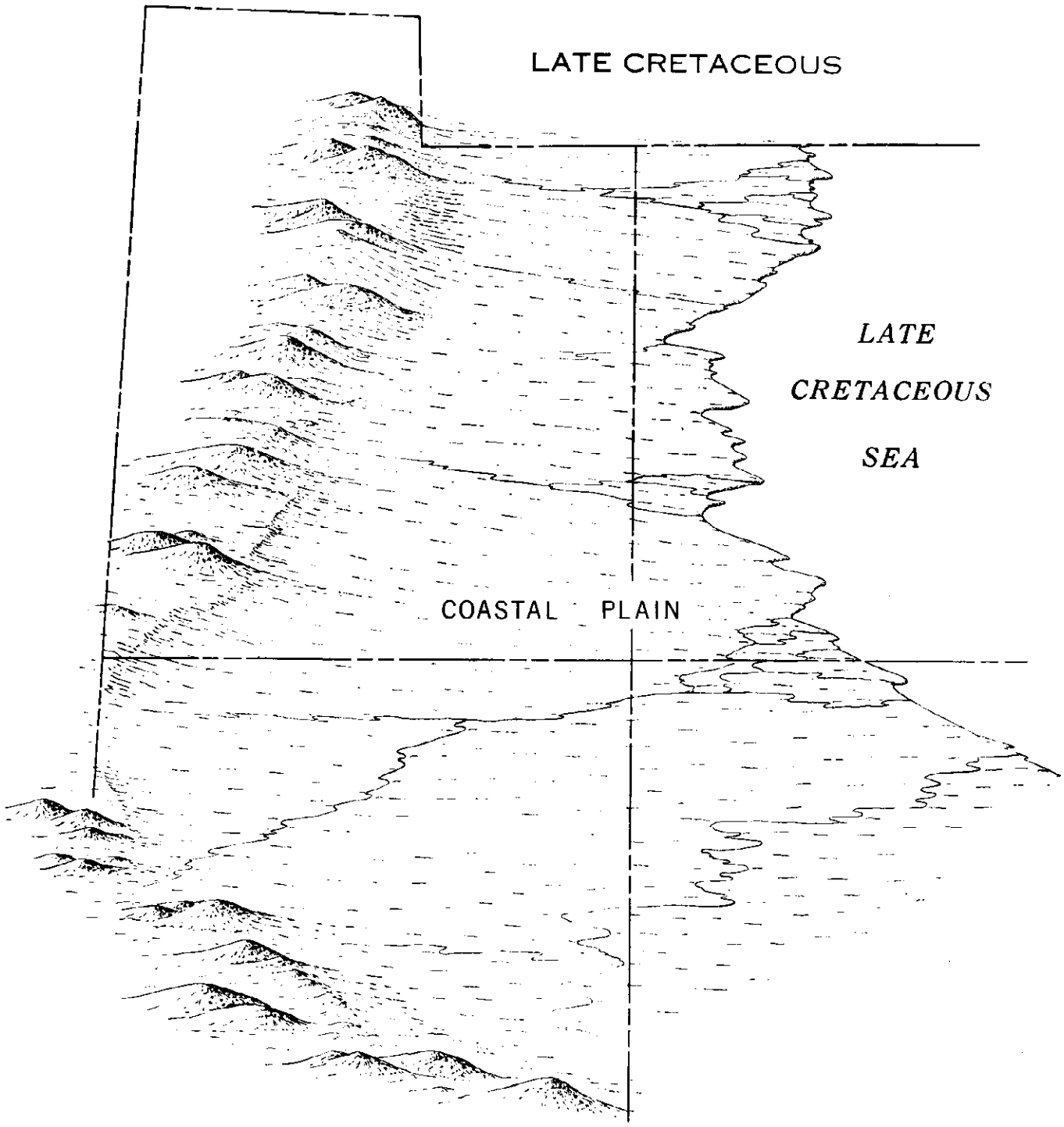


FIGURE 53.—The Colorado Plateau area in Late Cretaceous time. The area was part of a coastal plain that extended eastward from the foot of mountains in central Arizona and central Utah. The edge of the Late Cretaceous Sea was to the east in Colorado.